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Policy options and possible actions to expedite implementation: climate change

Report of the Secretary-General

Summary

The increasingly evident impacts of climate change at various levels lend the issue a particular sense of urgency. International cooperative efforts can help ensure that timely and effective action is taken to mitigate the causes as well as the effects of climate change, to further the implementation of Agenda 21 and the Johannesburg Plan of Implementation and to achieve the goals of sustainable development.

A comprehensive climate change strategy encompassing coherent policies and actions with respect to energy, industry, forestry and waste management could yield multiple benefits for greenhouse gas mitigation and sustainable development objectives. Policy options and possible actions to achieve these objectives could include a combination of improved energy efficiency, increased renewable energy use, better agricultural practices, and sustainable forest and waste management. Such a strategy could include stable incentives and measures to enhance the use of market-based mechanisms, including scaling up the carbon market, and expanding the range of clean development mechanism activities.

Countries vulnerable to the adverse impacts of climate change, especially least developed countries and small island developing States, require increased assistance for the development and implementation of adaptation strategies. This could include improving the dissemination of information, enhancing resilience to the adverse impacts of climate change and climate variability and integrating adaptation measures into national sustainable development strategies and national development planning.

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I. Introduction

1. At its fourteenth session, the review session of the second implementation cycle 2006-2007, the Commission on Sustainable Development undertook an evaluation of progress in implementing Agenda 21, the Programme for the Further Implementation of Agenda 21 and the Plan of Implementation of the World Summit on Sustainable Development (the Johannesburg Plan of Implementation), while focusing on identifying constraints and obstacles in the process of implementation with regard to the current thematic cluster. This cluster covers the issues of energy for sustainable development, industrial development, air pollution/atmosphere and climate change. The report of the review session[1] includes a Chairperson's summary that reflects the constraints, obstacles, possible approaches and best practices for the implementation of these intergovernmental agreements, as well as the way forward identified by the ministers attending the high-level segment.

2. The fifteenth session of the Commission on Sustainable Development will take policy decisions on practical measures and options to expedite implementation for the selected thematic cluster of issues, taking into account the discussions of the intergovernmental preparatory meeting, reports of the Secretary-General and other relevant inputs. The present report is a contribution to the Commission's discussions on policy options and possible actions to address the constraints and obstacles in the process of implementation identified in the report of the review session with regard to climate change. Reports on the other issues of this thematic cluster and on the cross-cutting issues identified at the eleventh session of the Commission are available (see E/CN.17/2007/2-4 and 6) and, since the issues are interlinked, there are references to them in the present report.

3. The present report draws on a number of sources, including national reports and case studies submitted by Member States, the outcomes of regional implementation meetings and contributions from major groups and secretariats of various United Nations convention bodies. As close linkages exist among the four issues of this thematic cluster, the relevance of these interlinkages for policy options is considered in a separate report (see E/CN.17/2007/6). Although cross-cutting issues identified at the eleventh session are considered throughout the report, many are addressed in the present separate report.

II. Climate change: a threat to sustainable development

4. Climate change during this century is likely to entail increased frequency and intensity of extreme weather events, increases in sea level and ocean acidity that will not be reversible for centuries to millennia, large-scale shifts in vegetation with major losses of climate-sensitive plant and animal species and significant shifts in the geographical ranges of disease vectors and pathogens. A recent study[2] has concluded that if greenhouse gases continue to be emitted without abatement, between 5 and 20 per cent of the global gross domestic product (GDP) could be lost by the beginning of the next century. On the other hand, it projects that stabilizing atmospheric concentrations of greenhouse gases at roughly twice pre-industrial levels could cost 1 to 3 per cent of the global GDP. A comparison of these levels of

[1] *Official Records of the Economic and Social Council, 2006, Supplement No. 29* (E/2006/29).

[2] Stern Review on the Economics of Climate Change, November 2006.

spending with the potential costs of greenhouse gases emissions indicates that taking action today aimed at stabilizing the concentrations is a good long-term investment.

5. The United Nations Framework Convention on Climate Change remains the central multilateral framework for cooperative actions to mitigate climate change by reducing greenhouse gas emissions and enhancing their removal by sinks, and to adapt to the adverse impacts of climate change. There is broad agreement that international cooperation and actions at the national level on all aspects of mitigation and adaptation should be promoted. At the eleventh Conference of the Parties to the Convention, the parties launched a dialogue to analyse strategic approaches for long-term cooperative action to address climate change, focusing on sustainable development, adaptation, technology, and market-based opportunities. In a parallel process, the Parties to the Kyoto Protocol of the Convention initiated a process to consider further commitments beyond 2012, when the current commitment period terminates.

6. An integrated approach that considers the social, economic and environmental dimensions and encompasses coherent policies and measures in all the relevant sectors -- including energy, agriculture, water, waste management, industry, transport and coastal zone management — could be conducive to achieving a comprehensive, long-term response to climate change. To this end, there is an opportunity to more firmly link climate change to the broader agenda of sustainable development by integrating climate-change response policies with national development planning, national sustainable development strategies and poverty reduction strategies.

7. A comprehensive climate-change mitigation strategy can yield multiple benefits for sustainable development objectives. For instance, improving energy efficiency not only provides an effective policy option for reducing global greenhouse gas emissions, but also yields such domestic environmental, economic and social co-benefits as reduced local air pollution with associated health benefits, cost savings for energy consumers, and avoiding or postponing the construction of additional generation capacity. When generated using renewable energy, electricity provides numerous economic and social co-benefits — from new income opportunities to improved education, health care and information access — with no greenhouse gas emissions.

8. Sustainable forest management can contribute to terrestrial carbon sequestration and have beneficial effects on water supplies and biodiversity. Policies designed to enhance carbon sequestration through fuelwood management could also improve natural resource management. For instance, a World Bank project in Senegal, based on community management of forest resources, ensured a sustainable fuelwood supply and provided livelihood activities such as honey, livestock, vegetable, tree crop and poultry production. Other components were demand-side management through improved cookstove and fuel substitution. The co-benefits were improved living standards, sustainable forest and rangeland management and carbon sequestration.

9. Climate change will exacerbate water shortage and quality problems in many water-scarce regions. Climate change impacts the frequency and intensity of floods and droughts, and water quality and availability. It will also pose daunting challenges for water management, which is best addressed through integrated water

resources management. Therefore, policy options are needed to enhance adaptive capacities, particularly in vulnerable countries, to minimize those adverse impacts. Policy options that could be considered include: increasing water-use efficiency on the demand side, such as through pricing incentives and regulations; increasing the reliability of the water supply, such as through increasing water storage capacity and constructing water diversion infrastructure; and reformulating flood management plans.

10. Existing technologies could play an important role in improving energy efficiency and reducing greenhouse gas emissions in the short term. Yet policies and actions are also needed that could accelerate improvements in these technologies as well as the development of new technologies required to achieve more substantial greenhouse gas reductions in the long term. Thus, energy technology research and development are key components of long-term mitigation strategies. In many countries, public and private spending on these investments is stagnant or declining. Enhanced public support for, and incentives for private investment in, energy technology research and development could form an important element of an overall strategy to overcome the technical and cost barriers faced in developing promising clean energy technologies. International initiatives for technology cooperation between developed and developing countries could provide developing countries with access to advanced technologies and improve their capacities for using, adapting and further refining these technologies.

11. While many cleaner technologies offer co-benefits that may justify their adoption without reference to climate change concerns, other technologies would require incentives and a supportive policy environment. Policies and actions could accelerate the rate at which new clean technologies are adopted and commercialized. Risks associated with new energy technologies could be addressed through government support for the construction of full-scale demonstration plants, which prove that technologies are viable at scale and under normal operating conditions. Various policies could be used to support the deployment of new technologies that are not yet cost-competitive, but which are expected to be less costly with experience and wider deployment.

12. The carbon market taking shape, first in Europe and then globally as a result of the Kyoto Protocol, is setting a price on "carbon" (i.e., the greenhouse gases covered by the Kyoto Protocol), which provides an incentive to reduce emissions so long as the cost of reduction is below the market price for carbon. Pricing carbon can also be achieved by means of a carbon tax, with the possibility that revenues could be invested in low-carbon technologies. Since it is difficult to predict the price of carbon many years ahead, energy and other enterprises are hesitant to invest in long-lived capital with a lower carbon emissions profile. Progress towards a global regulatory framework with a longer time-horizon and stable incentives could stimulate investment in clean energy technology and remove market uncertainties regarding the credibility of the carbon markets. Meanwhile, recent research suggests that the costs of delay in taking action to reduce greenhouse gas emissions could be much higher than previously thought. Consideration of this possibility has motivated some energy and other enterprises, as well as some Governments, to devote larger resources to research and development into low-carbon energy technologies. Further public support for such research and development could promote public welfare as well as private profits.

13. According to the International Energy Agency, carbon dioxide (CO_2) capture and storage technology could control emissions from fossil-fuel power plants at relatively low cost, but would not be adopted without an incentive, such as a market price for carbon or an explicit subsidy. The use of CO_2 as a resource, such as for enhanced oil recovery, provides an added incentive to capture CO_2. Several enhanced oil recovery projects under development would capture the CO_2 from power plants and pipe it into mature oil fields.

14. A significant percentage of the power plants in developed countries will be replaced in the coming decades, while sharply rising demand for electricity in rapidly industrializing countries is driving the construction of new power plants. This situation presents an important opportunity to ensure that the new power plants either incorporate CO_2-capture systems from the outset or are designed to be retrofitted with such systems. Research is expected to reduce the cost of these systems. This underlines the importance of policies and actions that promote further research on and the rapid deployment and commercialization of CO_2 capture and storage technologies. In this respect, the aim of the Carbon Sequestration Leadership Forum, an international climate change initiative with 21 country members that promotes the development and sharing of technologies for CO_2 capture and sequestration, is to make these technologies broadly available internationally.

15. Energy efficiency improvements could significantly mitigate greenhouse gas emissions, in many cases at lower cost than other available abatement options, but policies and actions are required to overcome information gaps and market, institutional and financial barriers. Policies promoting energy efficiency in stationary infrastructure with long lifespans, such as in new power plants and buildings, could make a significant contribution, in some cases with net savings. Given that the transport sector is the fastest growing source of CO_2 emissions, policies and actions to enhance vehicle efficiency could also be an important part of efforts to reduce CO_2 emissions. Improving vehicle efficiency would also help to address urban air pollution, a major source of which is motor vehicles, and attract consumers faced with higher fuel prices.

16. International cooperation could significantly enhance the effectiveness of policies to promote the development, deployment and diffusion of new and less greenhouse gas-emitting technologies. Such collaboration could avoid duplication of effort and facilitate further improvement through information exchange. For example, Coalfleet for Tomorrow is an industry-led, broad-based collaborative research programme that brings together power producers, equipment suppliers and research partners from five continents with the goal of making available a portfolio of advanced coal technologies. Policies and actions supporting such technology collaboration and deployment could assist in achieving the diffusion of new technologies, as well as engage more countries in the mitigation of greenhouse gas emissions.

17. The establishment of enhanced investment frameworks for clean energy, such as the investment framework for clean energy and development under discussion at the World Bank, could significantly scale up the required investments, particularly if policies can leverage private financing. International support could also facilitate the participation of developing countries, particularly African nations, in carbon

markets through increased capacity-building to enable active participation in the clean development mechanism.

18. Greenhouse gas emissions from aviation and marine bunker fuels are rising rapidly, driven by the growth in air travel and international trade, respectively. Given the lack of substitutes for aviation and marine bunkers, efficiency improvements are the focus in both transport sectors. With respect to aviation, the Intergovernmental Panel on Climate Change (IPCC) has estimated that fuel burn could be reduced by 6 to 18 per cent with better operating measures, particularly air traffic control. The International Civil Aviation Organization (ICAO) reports on its emissions-related activities to the United Nations Framework Convention on Climate Change, in particular initiatives to improve the quality of data reporting and comparability of aviation emissions. Similarly, the International Maritime Organization (IMO) cooperates with IPCC and the Convention bodies on methodological issues. Working within the framework of these organizations, further action could be taken to address greenhouse gas emissions from aviation and shipping.

19. While international cooperation is essential to tackling the global challenge of climate change, it is likely to succeed only if underpinned by national and local initiatives. In many countries, Governments, local authorities, private companies, educational and other institutions and other stakeholders are adopting a broad range of measures to reduce their greenhouse gas emissions. In some countries, policy innovation is occurring at the provincial/state and local levels. Numerous public and private sector institutions and organizations have adopted policies that commit them to offsetting their greenhouse gas emissions through the purchase of carbon credits from such sources as low-carbon energy projects, reforestation and sustainable forest management programmes.

III. Adapting to climate change

20. According to IPCC, the available evidence indicates with a high degree of confidence that recent changes in average global temperature have had discernible impacts on many physical and biological systems and on biological diversity and desertification. The impacts of accelerating climate change and intensifying climate variability also pose a threat to economic and social systems, for instance in the case of more frequent and extensive droughts and floods. While current information already warrants urgent action, there is a need for more analysis to improve the understanding of the impacts of climate change and climate variability on economic and social development. Such research and the evaluation of ongoing projects, while necessary to improve the understanding of which adaptation measures are most effective, should not detract from the need to begin taking action now. Measures which enhance capacities to forecast and plan for adaptation to climate change are, therefore, urgently needed, particularly in developing countries, to reduce vulnerability to climate change impacts, including extreme weather events.

21. Adaptation is a multi-faceted challenge and, to be effective, strategies to adapt need to proceed at several levels simultaneously. The direct impacts of climate change are felt locally and more broadly and, therefore, responses must address these circumstances. At the same time, for such efforts to be sustainable and, in

some cases, possible, they need to be guided and supported by national policies and strategies. These, in turn, may be facilitated through international efforts.

22. Options that enhance capacities for nations and societies to adapt to climate change include a broad range of options, from specific measures and actions to adjust to new climate risks at the sectoral and community level, to a comprehensive set of policies and measures that generally enhance the capacity to adapt, which is in large measure a function of a society's level of wealth, education and access to technology. Moreover, these options can be part of general national development strategies. At the community and national levels, one practical option to reduce vulnerability and facilitate preventive steps could be effectively disseminating information on additional climate risks and extreme events to decision makers and affected populations. For vulnerable developing countries, this could be facilitated by international support from the donor community and multilateral organizations, including through identifying and supporting low-cost or negative-cost adaptation measures and technologies in least developed countries and small island developing States.

23. Support for actions to enhance research, observation and early warning capacities for adaptation to climate change, particularly in developing countries, could contribute to lowering existing uncertainties relating to the timing and scale of impacts, especially at the regional level. One practical option could be to strengthen the national capacity for data collection and early warning in developing countries. Seasonal forecasting is one adaptation strategy for farmers, who could act on the information by adjusting planting schedules or crop/cultivar choices. Early warning, including effectively disseminating this information to decision makers and affected populations, could facilitate preventive steps. Such measures could be incorporated in comprehensive national adaptation strategies.

24. Research in the water sector indicates that climate change may decrease water availability in some areas and increase it in others. In this context, specific measures include the design and construction of infrastructure for water management which benefit from taking these research results into account within an overall policy of integrated water resource management. Such an approach could be enhanced by strengthening the role of local authorities in the planning process. Since many countries possess limited capacity to implement integrated water resource management, international support for introducing good water management practices and building the capacity of the relevant institutions are necessary and could also contribute to meeting the Millennium Development Goals and alleviating poverty.

25. Regarding agriculture, in areas where the climate change impact on agriculture are likely to be negative, basic adaptation measures, such as altering planting dates and cultivar choices, could be taken. More intensive, and expensive, adaptation options could include the introduction of irrigation systems. In areas prone to drought, farmers could benefit from the introduction of drought-resistant crops. Adaptation measures that strengthen and improve land management practices could improve resiliency to these impacts. In addition, since cultivation practices and land-use change can affect sources of greenhouse gas emissions, environmentally sound cultivation methods and better land-use planning could contribute to reducing CO_2 emissions.

26. Concerning human health, IPCC concludes that while some effects may be positive, most of the diverse potential health impacts from climate change are likely to be negative. The risk posed by extreme weather events such as heat waves could be mitigated through increased public awareness and public health-care initiatives for the most vulnerable. The geographic range of some vector-borne infectious diseases, such as malaria, could expand with an increase in temperature and conducive rainfall patterns. The possible impact of climate change on health in all countries provides an additional reason for investing in medical research on vector-borne diseases and for strengthening and maintaining public health systems, particularly in developing countries.

27. Research shows that weather-related losses have been rising steadily over the past half century, with part of the increase due to socio-economic factors, such as increased wealth and urbanization in vulnerable areas, and part linked to climatic factors such as changes in precipitation, flooding and droughts. Whether or not such losses can be attributed to climate change, the risk posed by weather-related disasters could be partially mitigated by insurance schemes and enhanced public awareness and dissemination of information concerning risks. At the same time, owners of property in certain vulnerable coastal areas have experienced a sharp rise in premiums or are no longer able to obtain coverage from private insurers. Practical measures, such as appropriate zoning and building codes, can reduce risks. For instance, in the United States of America, the insurer-funded Institute for Business and Home Safety supports a programme to improve the disaster resilience of homes and businesses, which has demonstrated significant loss avoidance for low investment.

28. As shown at the national and community levels in recent studies and assessments, including those under the National Adaptation Programmes of Action process of the United Nations Framework Convention on Climate Change and the Assessments of Impact and Adaptations to Climate Change project, policies and investments that enhance the capacity of communities to adapt to climate change could, if properly designed, improve economic opportunities and livelihoods. Actions that alleviate poverty and hunger, empower women and improve access to basic services, such as potable water and education, would reduce the overall vulnerability of communities to the impacts of climate change. Thus, improving livelihoods can enhance resilience and capacity to cope with climate variability. Particularly where communities are already vulnerable due to climate variability or environmental change, actions that strengthen adaptive capacity can serve a dual purpose. For instance, in arid and drought-prone areas, adaptation concerns may be an additional reason to implement possible actions such as water conservation. Similarly, rainwater harvesting is a possible action for small island developing States faced with groundwater salination as a result of saltwater intrusion or water scarcity resulting from variable rainfall patterns.

29. At the institutional level, potential responsibility for adaptation measures is often spread across levels of Government and spans sectors such as agriculture, water, coastal zone management, and disaster preparedness. At the same time, adaptation may not be considered a core function of any of the affected sectoral government bodies and agencies. Based on national policy, as set out in their national sustainable development strategy or other similar document, one policy option is to integrate adaptation planning into the work of affected agencies, as well as inter-agency bodies covering sectors such as health, economic policy and natural

resources. Adaptation strategies and plans could be enhanced on the basis of lessons learned and expertise developed in the area of disaster risk reduction and management, including effective early warning, land-use planning, construction standards and risk assessment in development projects.

30. At the international level, there are several channels providing technical assistance to developing countries that could be further strengthened to enhance adaptive capacities and to implement actual adaptation measures. Under the United Nations Framework Convention on Climate Change, international mechanisms to support adaptation measures include three new funds and associated processes: the Special Climate Change Fund, which includes support for the implementation of adaptation activities where sufficient information is available; the Least Developed Countries Fund, which includes support for the preparation and implementation of National Adaptation Programmes of Action; and the Adaptation Fund, under the Kyoto Protocol. Progress was made on the establishment of the Adaptation Fund at the twelfth Conference of Parties to the Convention by defining the principles and modalities governing the administration of the Fund. It is expected that programme priorities and eligibility criteria for the activities to be supported by the Adaptation Fund will be determined at the thirteenth Conference of Parties. The Global Environment Facility has introduced its strategic priority, piloting an operational approach to adaptation, which aims to reduce vulnerability and to increase adaptive capacity to the adverse effects of climate change in the focal areas of the Facility. To date, international efforts on adaptation under the Convention have focused on delivering information, some resources and capacity-building, especially in relation to the assessment of impacts and adaptation. In most cases, it has yet to facilitate significant on-the-ground implementation, technology development and diffusion, or the establishment of robust national institutions to implement an adaptation agenda.

31. Another broad approach to adaptation is to work through existing channels of multilateral and bilateral assistance to promote the integration of adaptation needs into development support. At a meeting in April 2006, the ministers of environment and development cooperation of the member countries of the Organization for Economic Cooperation and Development (OECD) adopted a declaration on integrating climate change adaptation into development cooperation. Vulnerability assessments for projects financed through development assistance can be an effective means of identifying investments that would increase climate resilience. The World Bank estimates that 20 to 40 per cent of official development assistance and concessional finance ($20 to 40 billion) may be subject to climate risk.

IV. Policy options and possible actions at the international level

32. The international effort to respond to the climate challenge will arise not from a single solution, but from a broad array of measures and strategies, which could be pursued simultaneously.

33. **Policy options and possible actions at the international level that could be considered with regard to climate change and sustainable development include:**

- **Enhancing access to cleaner energy technologies, including renewable energy, energy efficiency and advanced fossil-fuel technologies such as**

CO_2 capture and storage technologies, through promoting cooperation initiatives and partnerships at the regional and international levels; and

- Continue efforts to elaborate a framework with stable incentives and a long-term time horizon, among other things, by enhancing the use of market-based mechanisms, including in particular scaling up the carbon market, and expanding the range of clean development mechanism activities;

- Enhancing cooperation for developing and implementing adaptation programmes by involving a broad range of stakeholders and communities that could help all, but particularly developing, countries in assessing and planning for adaptation and reducing vulnerability to climate risks, and in taking informed decisions at all levels;

- Supporting vulnerable countries, especially least developed countries and small island developing States in the development of comprehensive national adaptation strategies for climate change and climate variability, including improving the dissemination of information relating to climate change-related risks at all levels of policymaking and integrating these strategies into national sustainable development strategies and national development planning;

- Providing assistance to vulnerable countries, especially least developed countries and small island developing States, to implement high-priority measures in national strategies, including for identifying and supporting low-cost or negative-cost adaptation measures and technologies;

- Providing technical assistance to strengthen the data collection, observation and research and assessment capabilities of developing countries in order to enhance their early warning and seasonal forecasting capacities, improve the dissemination of information relating to droughts, floods and extreme weather events, strengthen surveillance, control and treatment of vector-borne diseases and improve capacity for regional-level impact assessment and modelling;

- Support efforts to raise the awareness and the profile of climate change within government, including through the greater involvement of economic, finance and planning ministries and agencies.